

Marine Spill Analysis System Business Plan

The following is a proposal to initiate a collaborative, multi-agency project to evaluate and enhance the spill geographic information system (GIS) tools within the Marine Spill Analysis System (MSAS), and to evaluate a framework for coordinating future GIS tool development with the coastal community and the GIS software industry.

BACKGROUND

Spill planning and response activities have always relied on maps and charts to display information. From simple notes on nautical charts to specialized maps showing the location of sensitive resources or the location of an oil slick, many of the essential information components of planning and response actions require geospatial data. It is only natural that the application of geographic information systems (GIS) would expand to include response and planning functions.

The first large-scale application of GIS during a spill response came during the *Exxon Valdez* spill, when both Exxon and the State of Alaska conducted GIS activities spanning three years in support of shoreline cleanup. Over the ensuing ten years, state and federal response agencies and the private sector have developed spill-related GIS applications. While GIS tools are useful during response operations, they have more traditionally been applied to spill contingency planning activities.

Florida has been one of the most active state organizations, along with New Jersey and Texas, in developing GIS applications for spill planning and response. Although many spill applications were originally developed within the traditional GIS environment, most have moved to simpler desktop mapping systems to allow emergency personnel without extensive GIS expertise to easily access critical spill information. The ArcView® 3.0 version of MSAS developed by Florida can be described as a GIS application allowing managers, biologists, and technicians to load, view, analyze, and publish spatial data sets involving coastal spill management and protection scenarios.

Digital data sets using consistent data models are critical components of any coastal GIS that may be utilized by numerous, although unique organizations. The National Ocean Service (NOS) of the National Oceanic and Atmospheric Administration (NOAA) has developed the most extensive and consistent GIS-based data set for spill planning and response in the form of Environmental Sensitivity Index (ESI) maps. Over the last eight years, NOS, in conjunction with many state agencies has developed GIS-based ESI maps for much of the coastal U.S., including the Great Lakes. ESIs provide a primary underlying MSAS data set.

Efforts are also underway to enhance the functionality of ArcView for many coastal management issues not necessarily related to marine spills, including resource permitting and improved access to natural resource information. Agencies involved in these enhancements include the Florida Department of Environmental Protection, NOS, and the Minerals Management Service.

The need for coordination in coastal GIS tool development

There is a generally recognized lack of coordination in the development of GIS tools for coastal management. This view is shared among state coastal managers, GIS program coordinators, software vendors, and many entities within NOS. Due to the large number of diverse organizations and interests, it is generally felt that long-term federal coordination of tool development would be helpful in serving those using GIS for critical coastal management decision making. Although the immediate needs are most apparent for users of Environmental Systems Research Institute, Inc. (ESRI®) products, due to the high percentage of coastal states using this software, other coordination efforts with other software products could be needed in the future.

An opportunity for coordinating coastal GIS tool development

It is highly likely that a system such as MSAS will have significant appeal beyond the coastal states that are currently using it. The State of Connecticut has already demonstrated a desire to move in a direction similar to Florida with regard to coastal spill GIS. In addition to the benefits that could be realized by making MSAS available to other coastal managers, there are also opportunities to enhance the system by including outside opinions and design ideas during further development efforts.

While coastal spill GIS has been continually expanded and refined over the years using input from the original developing agencies, it is inefficient to continue a piecemeal development approach. Involving potential new users in further MSAS development will encourage a more robust, uniform, and cost-effective system for the entire coastal community. There are other potential applications that could be realized with MSAS as well, including use beyond the marine environment and management of events other than coastal spills.

A project to review the capabilities of MSAS and coordinate further development of the system could be highly beneficial to potential end users. With so many potential participants and issues, it is expected that federal coordination of such an effort, with states and other coastal management agencies as partners, will be the most beneficial approach. This partnership will provide an excellent opportunity for previously uninvolved agencies to add their experience and technical expertise. Such a project could demonstrate the utility of MSAS, work cooperatively to develop and evaluate system enhancements, and establish a collaborative framework for coordinating the development of future GIS tools for coastal resource management.

DESCRIPTION OF PROPOSED ACTIVITY

The NOAA National Ocean Service proposes to initiate a project to evaluate, improve, and increase availability of MSAS. This effort will be led jointly by the Coastal Services Center (CSC) and the Office of Response and Restoration (ORR), working in cooperation with state and federal agencies with interests in the project, as well as the private sector. As there is a need for coordination beyond the realm of coastal spill GIS tools, it is hoped that this plan may serve as a NOS model for future efforts.

The NOS MSAS project will encompass three iterative functions:

1. Reviewing and evaluating MSAS. The initial evaluation, primarily an internal NOS activity, will take about six months. The evaluation will consider issues of data formats, component functionality, and component importance.
2. Demonstrating the program to spill planning and response organizations, current coastal GIS users, and other NOS elements to determine the demand for functional program improvements, supporting data types, and training.
3. Enhancing MSAS functional components through cooperative agreements.

It is expected that this process may be repeated periodically for continued enhancement of MSAS over time. A similar NOS procedure may also be followed for future coastal management GIS applications. In an effort to facilitate continued and coordinated tool development, CSC will develop and maintain a World Wide Web site to track information on MSAS and related tools. This site will contain information such as tool development background, ability of tools to integrate with other applications and data models, tool version tracking, areas of current development, suggestions for additional tools, etc. Users would also have the ability to download the most current version of approved extensions and would be encouraged to provide feedback on the utility of these tools.

Proposed Organizational Roles

CSC will be the primary provider of GIS technical guidance, while ORR will provide spill planning and response technical guidance, and advise on proposed tools during the development process. CSC and ORR will communicate and collaborate closely on all outreach activities, technical guidance issues, and decisions involving partner organizations.

The Florida Marine Research Institute (FMRI) has provided the majority of support for MSAS development. FMRI will continue to play a role in further development of MSAS by familiarizing project participants with the system, reviewing proposed functionality improvements, and evaluating system enhancements.

State and federal coastal management agencies are potential project participants and will be major beneficiaries of this effort. Spill planning and response organizations, coastal GIS users, and other elements within NOS will be queried initially for project interest. After MSAS familiarization, these organizations will be surveyed for increased functionality suggestions. These partners will later participate in field-testing and evaluation of system enhancements.

Steering Committee

Because this project will affect numerous organizations and involve many different resource management responsibilities, financial resources, and technologies, a Steering Committee (SC) will be formed to help guide the overall creative process. This committee will be made up of significant project contributors and will work to determine project scope, as well as to review and approve proposed system enhancements and expenditures of contributed monies. This process will be consistent with all interagency agreements that are considered binding to project partners.

Specific issues surrounding responsibilities, establishment of operating principles, and implementation will be determined by the Steering Committee once it has been formed. Because NOS has explicit mandates under the National Contingency Plan, actions of the Steering Committee must not direct MSAS development in a manner that conflicts with NOS programs, plans, or responsibilities. Similar consideration will be given to actions that might conflict with the established policies and requirements of other partner organizations as well.

Project Milestones

Critical project milestones will be as follows:

- 1) Complete NOS review of MSAS. (ORR, CSC)
- 2) Develop and maintain the MSAS web site. (CSC)
- 3) Survey the coastal community for interest in participating in the MSAS review and enhancement project. (CSC, ORR)
- 4) Demonstrate capabilities of MSAS to potential participants. (CSC, ORR, FMRI)
- 5) Provide period of hands-on MSAS familiarization and support. (CSC, ORR)
- 6) Determine increased functionality needs from participants. (CSC, ORR)
- 7) Seek commitment and funding from project participants. (CSC, ORR)
- 8) Review and approve proposed system enhancements and expenditures. (SC)
- 9) Establish MSAS enhancement contract; transfer funds. (CSC)
- 10) Develop increased functionality. (Contractor and/or in-house organization)
- 11) Field test and evaluate system enhancements. (all partners)
- 12) Approve the public release of the enhanced MSAS. (CSC, ORR)
- 13) Distribute product and provide outreach. (CSC, ORR)

IMPLEMENTATION ISSUES AND IMPEDIMENTS

Project funding

NOS will contribute a portion of the resources necessary to enhance MSAS. In addition to NOS contributions toward this effort, funding will be sought from coastal states and other partners for costs incurred in the continued development of MSAS, primarily software development and testing costs. NOS support activities such as system review, participant outreach, familiarization workshops, system testing and evaluation, and product distribution will only be accomplished through traditional NOS base funding.

Because this will be a joint project with non-profit organizations, public agencies, or research organizations, funds will be transferred from project participants to NOS via a Joint Project Agreement (JPA). NOS may enter into a JPA only if the following criteria are met:

1. The project is essential to furtherance of NOS programs.
2. The project is of mutual interest and cannot be done effectively without the participation of partner organizations and NOS.
3. The cost of the project is apportioned equitably, unless a waiver of any portions of the cost has been approved.

Per NOAA requirements, a budget must be constructed and must include separate breakouts of costs contributed by NOS and the partner organizations to demonstrate equitability in the conduct of the joint project. Payments to NOS must generally be made in advance of project initiation, especially if the agencies participating are non-federal. However, payments may be made quarterly or delayed until project completion provided the necessary NOAA waiver has been obtained for each requesting partner organization.

Once partner contributions have been committed under the JPA, NOS will contribute project funding commensurate with its perceived benefits to ensure equitable apportionment among participating organizations as per requirements of the JPA. Once a detailed statement of work has been developed, NOS will then solicit, negotiate, establish, and administer the contract(s) with software or other product developers as needed.

Joint Project Agreements require approval of both NOAA General Counsel and the Department of Commerce General Counsel, which in some cases may take up to 60 days. Due to agency review requirements involving changes to a JPA, it will be incumbent upon NOS to establish a comprehensive and flexible agreement that allows for variations, such as new development directions, additional partners, engagement of additional product developers within the private sector, funding transfers in multiple directions, etc. when possible. In the event that an existing JPA does not allow for desired changes, additional agreements may need to be developed.

System software enhancements will generally be contracted out to the private sector, although in some cases may be developed using NOS or other in-house expertise. All circumstances involving expenditures of JPA funds will be reviewed and approved by the Steering Committee.

In some instances, there may be organizations that contribute independently toward further project development outside of a NOS Joint Project Agreement. This may be necessary because NOS cannot participate in a certain effort (e.g., not considered “essential to furtherance of NOS programs”), the contributor cannot participate (e.g., a “for-profit” organization), or because the contributor does not wish to be restricted by a formally administered JPA (e.g., narrow niche or fast-track tool development, training, etc.). These activities may be accomplished through other agreements between the contributing organization and the private sector, or other developer.

Provided that these non-JPA activities do not conflict with NOS programs, plans, or responsibilities, NOS will endeavor to facilitate these developments. However, NOS will not engage in any sort of active management (e.g., contract administration) with regard to these activities. Provided that these activities have been approved by the Steering Committee, the resultant applications that are developed could be incorporated into the approved MSAS.

Project participant surveys, familiarization workshops, and system evaluation

CSC and ORR will jointly conduct preliminary and system enhancement surveys through a combination of direct contacts, telephone interviews, Internet communications, and familiarization workshops. Workshops will be designed to demonstrate MSAS capabilities and provide hands-on training, and will be conducted regionally. Under contract to NOS, ESRI will assist in providing initial MSAS familiarization training and documentation to allow project participants to effectively evaluate the system and to suggest improvements in functionality. ESRI will also assist with technical support during the hands-on familiarization period. Testing of enhanced features of MSAS will be conducted by all interested partners under realistic scenarios when possible (e.g., drills, or spills on a non-interference basis).

Requests for enhanced MSAS tools from non-participating agencies

States or other organizations that do not participate (financially or otherwise) in the MSAS review and enhancement project may request the tools after the project has been completed. These organizations may decide not to participate for a number of reasons, including lack of funds, incompatible or no GIS program, or lack of interest. Although it is important to include as many participants as possible initially so that costs are lessened for all, the tools will not be withheld from any user once they have been developed.

Project participant requests for “expert” coastal spill tools

By assuming responsibility for developing and supporting MSAS with training, NOS will be either explicitly or implicitly sanctioning the application of the tool during oil spill planning, response, and restoration activities. Because of NOS's mandates under the National Contingency Plan as the lead agency for scientific support coordination and as a natural resource trustee, these ramifications must be carefully considered. This consideration applies to any functional components included in MSAS.

NOS will apply five general guidelines in evaluating MSAS as it now exists and to any proposed enhancements:

1. There is no conflict with NOS programs, plans, or responsibilities;
2. The inherent functions represent good practice in their intended application;
3. The function does not exclusively support a proprietary function;
4. The function supports open sharing of information among users, software, and computers;
and
5. The function does not conflict with NOS guidelines, practices, or standards for spill management, data structures, and exchange formats.

It is impossible to predict all of the functions that might eventually be requested to interface with or run within MSAS, but these five guidelines provide a framework for addressing such requests. It will be the responsibility of NOS to continually articulate an overall philosophy throughout the MSAS review and enhancement process regarding the development of inappropriate tools, sources of available expertise, and the need for standardized training.

Technological Advances

NOS recognizes that advances in GIS hardware and software technology are occurring at an extremely rapid pace. Although MSAS may now be considered a potential building block for a more comprehensive marine and coastal management GIS, there may also be inherent limitations that restrict its usefulness for more flexible and generic applications in the future. Because the majority of coastal managers currently using GIS are working within the ArcView environment, NOS will concentrate on effectively serving this community. NOS will endeavor to keep project participants informed of the latest trends in GIS technology so tools that are developed do not rapidly become obsolete. However, it will ultimately be the responsibility of the Steering Committee and other similar stakeholder groups to determine the direction of tool development for oil spill GIS and other coastal management applications that may follow.

SUMMARY

Federal coordination of GIS tool development will help serve the many diverse organizations using GIS for coastal management decision making. With states and other coastal management agencies as partners, NOS offers to lead a collaborative effort in evaluating, improving functionality, and increasing accessibility of MSAS. While MSAS has been continually expanded and refined over the years, it is inefficient to continue the current piecemeal developmental approach now being taken and unduly burdensome to the few organizations that are presently funding this type of development. Involving new users in further MSAS development will allow them to benefit from the system's capabilities and encourage a more robust, uniform, and cost-effective system for the entire coastal community. Including new partners will also allow the project to benefit from their extensive expertise in areas such as oil spills, GIS, and resource management.

This project will demonstrate the utility of MSAS to other coastal agencies, work cooperatively to develop and evaluate enhanced coastal spill tools, and evaluate a collaborative framework for coordinating the development of future GIS tools for coastal management. Establishing such a collaborative framework will eventually help the coastal community realize other non-spill applications of new coastal GIS tools.